CLAIMS

1. An electrode head including at least one bio-compatible electrode, comprising:

at least one printed circuit board (PCB) having a face area and a thickness; and

at least one bio-compatible electrode extending from the thickness of the at least one printed circuit board.

2. An electrode head according to claim 1, wherein the at least one printed circuit board comprises a plurality of printed circuit boards attached along their face areas.

3. An electrode head according to claim 2, wherein the plurality of printed circuit boards are attached with an adhesive which has at least 70% alcohol resistance.

4. An electrode head according to claim 2, wherein the at least one electrode comprises at least one electrode extending from each of the plurality of printed circuit boards (PCBs).

5. An electrode head according to claim 4, wherein the at least one electrode extending from each of the plurality of PCBs comprises at least eight electrodes extending from each of the PCBs.

6. An electrode head according to claim 1, wherein the at least one electrode comprises a plurality of electrodes which are held by the electrode head at fixed relative positions.

7. An electrode head according to claim 1, comprising at least one leading wire running along the at least one PCB and wherein the leading wire is formed as a single piece with one of the electrodes.

8. An electrode head according to claim 1, wherein the at least one electrode comprises at least one electrode tapered toward an end of the electrode, distal from the PCB.

9. An electrode head including at least one bio-compatible electrode, comprising:

a plurality of printed circuit boards (PCBs); and

a plurality of electrodes extending from the printed circuit boards, the electrodes being held by the circuit boards at fixed relative positions.

10. An electrode head according to claim 9, wherein the plurality of electrodes comprise gold plated electrodes.

11. An electrode head including at least one bio-compatible electrode, comprising:

a plurality of printed circuit boards (PCB), each having a face area and a thickness, each of the PCBs being positioned with respect to at least one other PCB such that at least a portion of its face area overlaps most of the face area of the other PCB; and

at least one bio-compatible electrode extending from at least one of the printed circuit boards.

12. An electrode head according to claim 11, wherein each of the PCBs is connected to at least one other PCB such that substantially all of its face area overlaps substantially all of the face area of the other PCB.

13. A bio-medical probe, comprising:

at least one electrode for placement on a tissue surface; and

a sensing circuit adapted to acquire signals impinging on the at least one electrode, wherein the sensing circuit is adapted to acquire the signals only if the at least one electrode is pressed against the tissue surface with at least a predetermined force.

14. A probe according to claim 13, wherein the at least one electrode comprises a two-dimensional array of electrodes.

15. A probe according to claim 14, wherein the electrodes of the two-dimensional array are located on a single flat plane.

16. A probe according to claim 14, wherein the electrodes of the two-dimensional array are organized in a rectangular array.

17. A probe according to claim 13, wherein the at least one electrode comprises one or more electrodes with pointed tips adapted to penetrate the tissue surface.

18. A probe according to claim 13, wherein the sensing circuit is adapted to provide a user indication when the at least one electrode is pressed against the tissue surface with at least the predetermined force.

19. A probe according to claim 13, wherein the sensing circuit is prevented from acquiring signals when the at least one electrode is pressed against the tissue surface with at least the predetermined force.

20. A probe according to claim 13, wherein the sensing circuit marks signals acquired when the at least one electrode is not pressed against the tissue surface with at least the predetermined force, as invalid.

21. A probe according to claims 13, wherein the at least one electrode does not contact the tissue surface unless the at least one electrode is pressed against the tissue surface with at least the predetermined force.

22. A probe according to claim 21, comprising a stopper which prevents the at least one electrode from contacting the tissue surface unless the at least one electrode is pressed against the tissue surface with at least the predetermined force.

23. A probe according to claim 22, comprising a power source for applying an equipotential to the stopper.

24. A probe according to claim 22, comprising at least one pressure exerting device which pushes the stopper toward the tissue surface.

25. A probe according to claim 24, wherein the at least one pressure exerting device comprises at least one spring.

26. A probe according to claim 24, wherein the at least one pressure exerting device comprises at least one pneumatic device.

27. A probe according to claim 24, wherein the at least one pressure exerting device comprises at least one hydraulic device.

28. A probe according to claim 21, comprising a light source adapted to illuminate a tissue surface around which the stopper is placed.

29. A probe according to claim 13, wherein the predetermined force comprises between about 0.25 to 1 kilogram/force.

30. A bio-medical probe, comprising:

at least one electrode for placement on a tissue surface; and

a stopper coupled to the at least one electrode in a manner which allows relative movement of the stopper relative to the at least one electrode, and prevents the at least one electrode from passing the stopper by more than a predetermined distance.

31. A probe according to claim 30, wherein the at least one electrode is adapted to contact the tissue surface only when the stopper is pressed against the tissue surface by at least a predetermined force.

32. A probe according to claim 30, comprising a power source adapted to apply an equipotential to the stopper.

33. A probe according to claim 30, wherein the stopper is coupled to the at least one electrode through at least one pressure exerting device.

34. A probe according to claim 33, wherein the pressure exerting device comprises a spring.

35. A probe according to claim 30, wherein the at least one electrode is surrounded by the stopper.

36. A method of impedance imaging, comprising:

pressing at least one electrode against a tissue surface, such that the at least one electrode penetrates the tissue surface without penetrating the epidermis; and

sensing electrical signals from the at least one electrode.

37. A method according to claim 36, wherein the at least one electrode penetrates the tissue surface by at least 20 μm.

38. A method according to claim 36, wherein the at least one electrode penetrates the tissue surface by less than 70 μm.

39. A method according to claim 36, wherein pressing the at least one electrode against the tissue surface comprises pressing the at least one electrode against a tissue surface on which a lesion was identified.

40. A method according to claim 36, wherein the at least one electrode comprises a two-dimensional array of electrodes.

41. A method according to claim 40, comprising displaying an impedance image responsive to the signals sensed by the array of electrodes.

42. A method according to claim 36, wherein the at least one electrode is pointed at its distal end.

43. A method of examining a tissue surface of a patient, comprising:

placing a probe including at least one sensing element on a tissue surface, such that the at least one sensing element penetrates the tissue surface;

sensing electrical signals by the at least one sensing element; and

providing an indication on the tissue surface responsive to the sensed signals.

44. A method according to claim 43, wherein providing the indication on the tissue surface comprises providing an impedance map of the tissue surface.

45. A method according to claim 43, wherein providing the indication on the tissue surface comprises providing an indication on a probability that the tissue surface includes a cancerous tumor.

46. A method according to claim 43, comprising identifying a suspected tissue surface anomaly and placing the probe on the tissue surface comprises placing the probe above the suspected anomaly.

47. A method according to claim 43, wherein placing the probe on the tissue surface comprises placing a probe which includes a plurality of sensing elements on the tissue surface.

48. A method according to claim 47, wherein placing the probe on the tissue surface comprises placing a probe which includes a two-dimensional array of sensing elements on the tissue surface.

49. A method according to claim 43, comprising applying a stimulus signal to the patient remote from the tissue surface on which the probe is placed and wherein sensing the electrical signals comprises sensing electrical signals generated responsive to the applied stimulus signal.

50. A method according to claim 43, wherein the at least one sensing element penetrates the tissue surface by less than 70 μm.

51. A method according to claim 43, wherein the tissue surface comprises a skin surface of the patient.

52. A method according to claim 43, wherein the tissue surface comprises a surface of a cervix or rectum of the patient.

53. A method according to claim 43, wherein the at least one sensing element taper off with a sharp point.

54. A method of examining a tissue surface of a patient, comprising:

placing a probe including at least one sensing element on a tissue surface, the at least one sensing element is tapered toward the tissue surface;

sensing electrical signals by the at least one sensing element; and

providing an indication on the tissue surface responsive to the sensed signals.

55. A method according to claim 54, wherein the sensing elements have a triangular shape pointed toward the tissue surface.

56. A method according to claim 54, wherein the sensing elements have a concave shape facing the tissue surface.

57. A method according to claim 54, wherein the sensing elements have a convex shape facing the tissue surface.

58. A method according to claim 54, comprising identifying a suspected tissue surface anomaly and placing the probe on the tissue surface comprises placing the probe above the suspected anomaly.

59. A method of examining a skin surface of a patient, comprising:

identifying a suspected skin lesion;

placing a probe including a plurality of sensing elements on a skin surface above the identified lesion;

sensing electrical signals by the plurality of sensing elements; and

generating an impedance map responsive to the sensed signals.

60. A method according to claim 59, wherein identifying the suspected lesion comprises visually identifying the lesion.

61. A method according to claim 59, wherein the plurality of sensing elements are included in a planar array of elements and wherein generating the impedance map comprises generating a map parallel to the planar array.

62. A method according to claim 59, wherein generating the map comprises generating a map in which each pixel corresponds to a respective sensing element of the plurality of sensing elements.

63. A method according to claim 59, wherein generating the impedance map comprises generating a map including at least 32 pixels.

64. A method according to claim 63, wherein generating the impedance map comprises generating a map including at least 64 pixels.

65. A method according to claim 64, wherein generating the impedance map comprises generating a map including at least 128 pixels.

66. A method according to claim 59, comprising acquiring at least one impedance map of an area adjacent the skin lesion but not including the skin lesion.

67. A method according to claim 66, comprising providing a malignancy level indication responsive to the sensed electrical signals and the at least one impedance map of an area adjacent the skin lesion.

68. A method according to claim 66, wherein generating the impedance map responsive to the sensed signals is performed using at least one parameter selected responsive to the at least one impedance map of an area adjacent the skin lesion.

69. A method according to claim 68, wherein generating the impedance map responsive to the sensed signals comprises dividing the value of each pixel by a respective value of the at least one impedance map of an area adjacent the skin lesion.

70. A method according to claim 66, wherein acquiring the at least one impedance map of an area adjacent the skin lesion comprises acquiring at least two impedance maps on different sides of the lesion.

71. A method according to claim 59, comprising acquiring at least one optical image of the lesion.

72. A method according to claim 71, wherein acquiring the at least one optical image of the lesion comprises acquiring at least one close-up image and at least one far shot image.

73. An electrode head including an array of bio-compatible sensing elements, comprising:

a substrate; and

a plurality of sensing elements mounted on the substrate such that the distance between each two neighboring sensing elements is smaller than 1 mm.

74. An electrode head according to claim 73, wherein the plurality of sensing elements are organized in a rectangular array.

75. An electrode head according to claim 73, wherein the distance between each two neighboring sensing elements is smaller than 0.5 mm.

76. A probe for skin cancer examination, comprising:

a hand held casing;

an impedance probe, adapted to sense electrical signals from a tissue surface, encased in the hand held casing; and

a camera, adapted to acquire images of the tissue surface, encased in the hand held casing.

77. A probe according to claim 76, wherein the camera has a predetermined number of distinct focusing states.

78. A camera for acquiring images of skin lesions, comprising:

an image acquiring unit adapted to acquire images of tissue surface lesions; and

a lens adapted to be positioned in a plurality of distinct focusing positions, which determine the focus distance of an image from the lens.

79. A probe according to claim 78, wherein the lens has only two distinct focusing positions.

80. A probe according to claim 78, wherein one focusing position is adapted for acquiring images when the camera is placed on the tissue surface.

81. A probe according to claim 78, wherein one focusing position is adapted for acquiring images when the camera is distanced from the tissue surface by at least 50 cm.

82. A probe according to claim 78, wherein the camera does not include zoom apparatus.

83. A method of examining a patient, comprising:

identifying a suspected lesion;

acquiring at least one first impedance measurement of an area surrounding the suspected lesion but not including the suspected lesion;

acquiring at least one second impedance measurement including at least a portion of the lesion; and

providing an indication on the lesion responsive to the at least one second impedance measurement,

wherein acquiring the at least one second impedance measurement or providing the indication is performed using at least one parameter having a value determined responsive to the at least one first impedance measurement.

84. A method according to claim 83, wherein identifying the lesion comprises identifying a tissue surface lesion.

85. A method according to claim 84, wherein identifying the tissue surface lesion comprises identifying a cervix or skin lesion.

86. A method according to claim 83, wherein acquiring the at least one first impedance measurement comprises acquiring an impedance image comprising a plurality of pixels.

87. A method according to claim 83, wherein acquiring the at least one second impedance measurement comprises acquiring an impedance image of the lesion which includes a plurality of pixels.

88. A method according to claim 87, wherein providing the indication comprises displaying the impedance image of the lesion.

89. A method according to claim 88, wherein the at least one parameter comprises at least one normalization parameter.

90. A method according to claim 89, wherein the at least one normalization parameter comprises a normalization map which includes for each pixel of the impedance image a respective normalization value.

91. A method of providing an indication on a malignancy level of an anomaly, comprising:

generating a multi-pixel impedance image of the anomaly, each pixel having a value of an image impedance related parameter;

selecting a sub-group of pixels of the impedance image, including fewer pixels than included in the image, at least partially based on information external to the impedance image; and

providing an indication on the malignancy level of the anomaly responsive to the value of the image impedance related parameter of the selected sub-group of pixels.

92. A method according to claim 91, wherein generating the impedance image of the anomaly comprises generating an impedance image of a skin anomaly.

93. A method according to claim 91, wherein selecting the sub-group of pixels comprises selecting solely responsive to information external to the impedance image.

94. A method according to claim 91, wherein selecting the sub-group of pixels comprises selecting responsive to an additional impedance image in which each pixel has a value of an additional impedance related parameter.

95. A method according to claim 94, wherein the impedance related parameter comprises a conductance measured at a specific image frequency.

96. A method according to claim 95, wherein the additional impedance related parameter comprises a conductance measured at a second frequency different from the specific image frequency.

97. A method according to claim 91, wherein selecting the sub-group of pixels comprises selecting responsive to an optical image of the anomaly.

98. A method according to claim 91, wherein selecting the sub-group of pixels comprises selecting a predetermined number of pixels.

99. A method according to claim 91, wherein selecting the sub-group of pixels comprises selecting pixels at positions which fulfill a predetermined requirement.